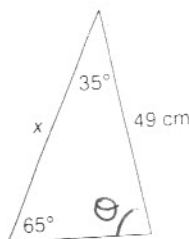


## 2.3 Sine Law, textbook pages 96-103

4. Solve for  $x$  to the nearest whole unit.

a)



$$\theta = 180 - 35 - 65$$

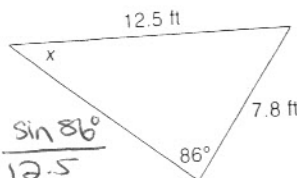
$$= 80^\circ$$

$$\frac{x}{\sin 80^\circ} = \frac{49}{\sin 65^\circ}$$

$$x = \frac{49 \sin 80^\circ}{\sin 65^\circ}$$

$$x = 53 \text{ cm}$$

b)



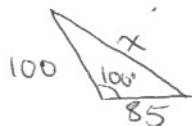
$$\frac{\sin x}{7.8} = \frac{\sin 86^\circ}{12.5}$$

$$\sin x = \frac{7.8 \sin 86^\circ}{12.5}$$

$$x = \sin^{-1}\left(\frac{7.8 \sin 86^\circ}{12.5}\right)$$

$$x = 38^\circ$$

## 2.4 Cosine Law, textbook pages 104-111

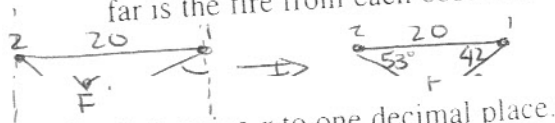
5. Two sides of a triangle are 100 mm and 85 mm in length. The angle between them is  $100^\circ$ . How long is the third side?

$$x^2 = 85^2 + 100^2 - 2(85)(100)\cos 100^\circ$$

$$x^2 = 20177$$

$$x = 142 \text{ mm}$$

## 2.5 Applications of Trigonometry, textbook pages 120-129

6. Two observers are 20 km apart when they spot a forest fire. The fire is  $48^\circ$  south-east of one observer and  $37^\circ$  south-west of the other observer. How far is the fire from each observer?

$$F = 180 - 50 - 42$$

$$= 88^\circ$$

$$\frac{a}{\sin 53^\circ} = \frac{20}{\sin 88^\circ}$$

$$a = \frac{20 \sin 53^\circ}{\sin 88^\circ}$$

$$= 16$$

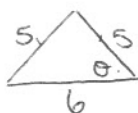
$$\frac{b}{\sin 42^\circ} = \frac{20}{\sin 88^\circ}$$

$$b = \frac{20 \sin 42^\circ}{\sin 88^\circ}$$

$$= 13.4 \text{ km}$$

7. Determine  $x$  to one decimal place.

#1



$$5^2 = 6^2 + 5^2 - 2(6)(5)\cos \theta$$

$$5^2 - 6^2 - 5^2 = -2(6)(5)\cos \theta$$

$$-36 = -60\cos \theta$$

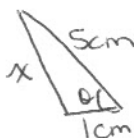
$$\frac{-36}{-60} = \cos \theta$$

$$0.6 = \cos \theta$$

$$\theta = \cos^{-1}(0.6)$$

$$= 53.1^\circ$$

#2

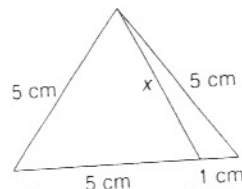


$$x^2 = 5^2 + 1^2 - 2(5)(1)\cos 53.1^\circ$$

$$= 20$$

$$x = \sqrt{20}$$

$$x = 4.5 \text{ cm}$$

8. Find the length of the diagonal of a regular pentagon with 10 cm sides.  
Hint: Refer to section 2.3, question 8, in this workbook for help.

$$x^2 = 10^2 + 10^2 - 2(10)(10)\cos 108^\circ$$

$$x^2 = 261.8$$

$$x = \sqrt{261.8}$$

$$x = 16.2 \text{ cm}$$

\* all of the angles are the same!

$$\text{total degrees: } (5-2)(180)$$

$$(3)(180)$$

$$\text{each angle } 540/5 = 108^\circ \quad \theta = 108^\circ$$